LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Withdrawn)

A reactor system comprising a reactor for reacting at least a reactant fluid comprising a reactant and a co-reactant fluid comprising a co-reactant, and mixing a diluent fluid comprising a diluent with one or more portions of reactant fluid, co-reactant fluid and/or products of their reaction to form a product fluid, the reactor comprising:

a duct having a local streamwise flow direction along a streamwise curvilinear fluid flow path and a first and second transverse directions mutually distinct from the flow direction, the first and second transverse directions defining a transverse surface through a reactor location transverse to the flow;

a reactant distribution portion comprising at least one reactant tubular portion having an inner surface and an outer surface, the inner surface defining a reactant flow path for the reactant fluid, and having a plurality of reactant distribution orifices extending from the inner surface to the outer surface, the plurality of reactant distribution orifices having an areal number density distribution, being the locally averaged distribution of the number of orifices per unit duct area transverse to the flow, and having a size distribution, the distributions being with respect to at least one of the transverse directions and;

a diluent distribution portion comprising at least one diluent tubular portion having an inner surface and an outer surface, the inner surface defining a first diluent flow path for the diluent, and a plurality of diluent orifices extending from the inner surface to the outer surface of the diluent tubular portion, the plurality of diluent orifices having an areal number density distribution and a size distribution, the distributions being with respect to at least one of the transverse directions;

a reactant delivery system for supplying the reactant fluid to the reactant distribution portion;

a co-reactant fluid delivery system for supplying at least a portion of the co-reactant to the duct, wherein the duct defines a streamwise co-reactant flow path for the co-reactant fluid;

a diluent delivery system for supplying at least a portion of diluent to the diluent distribution portion;

a controller for controlling the delivery of at least one of the reactant fluid, the co-reactant fluid and the diluent fluid to the reactor; and wherein at least one of the reactant and diluent orifice spatial density and orifice size transverse distributions is not spatially uniform.

Claim 2 (Withdrawn)

The reactor of claim 1 further comprising numerous delivery regions wherein the spacing between at least two nearby distribution orifices, the distance to an adjacent tubular distribution portion in a transverse direction, and a corresponding third distance selected in the streamwise fluid flow direction define the delivery region about at least one orifice, wherein the delivery of fluid through that orifice is controlled within that delivery region.

Claim 3 (Withdrawn)

The reactor of claim 2 wherein the distribution of the ratio of reactant to co-reactant is controlled in a direction transverse to the streamwise flow direction by controlling the relative delivery of the reactant flow to the flow of the co-reactant within numerous delivery regions within the duct.

Claim 4 (Withdrawn)

The reactor of claim 2 wherein the defined delivery regions comprise a plurality of delivery sub-regions and at least one reactant orifice and one diluent orifice each of which deliver fluid into one or more delivery sub-regions within the delivery region.

Claim 5 (Withdrawn)

The reactor of claim 4 wherein a diluent richer delivery sub-region is further controlled to have a higher diluent to reactant ratio, compared to another diluent leaner delivery sub-region controlled to have a lower diluent to reactant ratio.

Claim 6 (Withdrawn)

The reactor of claim 5 wherein at least one of the diluent leaner sub-regions comprises a combustible mixture.

Claim 7 (Withdrawn)

The reactor of claim 2 further comprising delivery regions having diluent compositions less than a quench composition of diluent relative to reactant and co-reactant at a given temperature, where a diluent composition greater than the quench composition will quench the reaction to below the self sustaining rate at that temperature.

Claim 8 (Withdrawn)

The reactor of claim 1 wherein the total amount of diluent delivered to the reactor exceeds the quench composition for a hypothetical composition of diluent premixed together with the total co-reactant and total co-reactant delivered to the reactor.

Claim 9 (Withdrawn)

The reactor of claim 8 wherein the amount of diluent delivered to a delivery region between two tubular portions, comprising a plurality of spatial sub-regions, as defined by the spacing between adjacent diluent fluid distribution orifices, a fraction of the distance to an adjacent tubular diluent distribution portion, and a streamwise flow distance is below the quench composition.

Claim 10 (Withdrawn)

The reactor of claim 9 wherein the diluent delivered to at least one delivery region is below 100% and greater than about 68% of the quench composition for the reactant and co-reactant for that specified region.

Claim 11 (Withdrawn)

The reactor of claim 9 wherein the diluent delivered to at least one delivery sub-region within a delivery region between tubular distribution portions is below 100% and greater than

about 68% of the quench composition for the reactant and co-reactant for that specified sub-region.

Claim 12 (Withdrawn)

The reactor of claim 9 wherein the reactable delivery sub-regions with delivered diluent amounts below the quench composition concentration within that region are interspersed with non-reactable delivery sub-regions with delivered diluent amounts above the quench composition concentration.

Claim 13 (Withdrawn)

The reactor of claim 12 wherein the reactable delivery sub-regions comprise evaporated diluent below the quench composition concentration plus liquid diluent, at least a portion of which evaporates after the upstream boundary of the reaction region.

Claim 14 (Withdrawn)

The reactor of claim 1 wherein at least a portion of at least part of the diluent delivery portion is positioned upstream of the reactant delivery portion in the reactor.

Claim 15 (Withdrawn)

The reactor of claim 14 wherein a portion of the diluent is evaporated prior to the location of onset of rapid reaction between the reactant and co-reactant.

Claim 16 (Withdrawn)

The reactor of claim 1 wherein the diluent orifice distribution is configured such that a prescribed portion of the diluent is evaporated within a specified distribution of evaporation distance along a streamwise curvilinear flow path, the distributions being in a direction transverse to the streamwise flow direction.

Claim 17 (Withdrawn)

The reactor of claim 1 wherein the one or more of the distribution of diluent orifice size, diluent orifice spatial number density, differential delivery pressure across the orifices, and

tubular portion gap are configured so that all of the diluent is effectively evaporated prior to a specified distribution of an evaporation distance along a curvilinear flow path, the distribution taken in a direction transverse to the curvilinear fluid flow direction.

Claim 18 (Withdrawn)

The reactor of claim 1 wherein the transverse distribution of local standard deviation of the prescribed reactant fluid delivery varies by less than 15% of mass flow over at least 80% of the duct cross-sectional area transverse to the flow.

Claim 19 (Withdrawn)

The reactor of claim 1, further comprising at least one tubular portion, each tubular portion having one effective outer surface and a plurality of inner walls defining a plurality of flow paths for at least one of the reactant fluid and the diluent fluid.

Claim 20 (Withdrawn)

The reactor of claim 1 wherein diluent fluid and reactant fluid are delivered through a plurality of passages.

Claim 21 (Withdrawn)

The reactor of claim 1 further comprising an igniter configured to ignite a reaction between the reactant fluid and the co-reactant fluid.

Claim 22 (Withdrawn)

The reactor as in claim 1 wherein the at least one tubular portion of the reactant distribution portion is located adjacent to the at least one diluent tubular portion of the diluent distribution portion to provide temperature control of at least a portion of the reactant distribution portion.

Claim 23 (Withdrawn)

The reactor of claim 22 wherein at least a portion of at least one diluent tubular portion is configured near at least a portion of the at least one reactant distribution portion,

wherein constraining the temperature of the reactant fluid and wherein reducing undesired thermal reaction products from occluding the reactant orifices.

Claim 24 (Withdrawn)

The reactor of claim 1 wherein the transverse distribution of orifice orientation of the diluent orifices is configured to control the distribution of diluent delivery in at least one transverse direction.

Claim 25 (Withdrawn)

The reactor of claim 1 wherein the diluent orifices have a cone angle having an inward or outward orientation and the transverse distribution of these cone angles is varied in at least one of the transverse directions.

Claim 26 (Withdrawn)

The reactor of claim 1 further comprising at least one heat exchange system comprising a heat exchange wall in one of radiation view or fluid contact with the product fluid.

Claim 27 (Withdrawn)

The reactor of claim 26 wherein the heat exchange wall further comprises one or more of an insulating layer, a perforated radiation shield, one or more radiation shields, operable to control the heat transfer properties of the wall, one or more of the thermal resistance of an insulating layer, the coverage of an insulating layer, the degree of perforation of the perforated radiation shield, and the distribution of the number of radiation shields, being configured to control the heat transfer between the product fluid and the heat exchange wall.

Claim 28 (Withdrawn)

The reactor of claim 1 wherein the reactor system further comprises a plurality of narrow passages between one or more of diluent tubular portions downstream of formation of a reactable mixture of reactant fluid and co-reactant fluid within the fluid duct, the narrow passages sized to constrain a downstream flame from propagating upstream through the narrow passages.

Claim 29 (Withdrawn)

The reactor of claim 1 wherein the duct further comprises a diffuser positioned at least partially upstream of the reactant distribution portion wherein reducing the velocity of the co-reactant fluid.

Claim 30 (Withdrawn)

The reactor of claim 29 wherein the diffuser comprises a plurality of flow splitter vanes configured to form a plurality of diffuser passages affecting the velocity of co-reactant fluid flow therein.

Claim 31 (Withdrawn)

The reactor of claim 30 wherein the plurality diffuser passages are configured to achieve a desired transverse distribution of a flow direction mass flow rate of the co-reactant fluid in at least one of the transverse directions downstream of the diffuser.

Claim 32 (Withdrawn)

The reactor of claim 30 wherein the desired transverse co-reactant fluid flow distribution is uniform within a prescribed uncertainty over at least 80% of the duct cross-section transverse to the flow.

Claim 33 (Withdrawn)

The reactor of claim 29 wherein the desired transverse co-reactant fluid flow distribution is higher near walls of the duct downstream of the diffuser as compared to the center of the duct.

Claim 34 (Withdrawn)

The reactor of claim 30 configuring the plurality of diffuser passages are configured to achieve a transverse distribution of the flow direction mass flow rate in the duct wherein the standard deviation of the streamwise flow direction mass flow rate is less than 15 % of a prescribed transverse distribution of the flow direction mass flow rate, evaluated in a duct cross section transverse to the flow downstream of the diffuser and upstream of the start of reaction.

Claim 35 (Withdrawn)

The reactor of claim 30 wherein each of the plurality of diffuser passages define an inlet area and an outlet area and wherein the ratios of the outlet area to the inlet area of each of diffuser passages are configured to reach a desired transverse distribution of a flow direction mass flow rate of the co-reactant fluid in at least one of the transverse directions downstream of the diffuser.

Claim 36 (Withdrawn)

The reactor of claim 30 wherein each of the plurality of diffuser passages define an included angle between adjacent diffuser passage walls that is between about 4 and 14 degrees.

Claim 37 (Withdrawn)

The reactor of claim 30 wherein at least a portion of the at least one diluent tubular portion is positioned substantially perpendicular to the fluid splitter vanes forming the diffuser passages.

Claim 38 (Withdrawn)

The reactor of claim 30 wherein at least a portion of the at least one diluent tubular portion is positioned substantially parallel to and near a downstream edge of at least one of the fluid splitter vanes forming the diffuser passages.

Claim 39 (Withdrawn)

The reactor of claim 29 wherein at least a portion of the diluent delivery system is located downstream the diffuser inlet and upstream of at least a portion of the fuel delivery system.

Claim 40 (Currently Amended)

A method of reacting reactants in the presence of diluent, the method comprising:

configuring a reactor; the reactor having a streamwise curvilinear fluid flow direction and a first and second transverse directions mutually distinct from the streamwise flow direction, the first and second transverse directions defining a surface through a reactor location transverse to the flow;

configuring a reactant delivery system and delivering a reactant fluid comprising reactant to the reactor;

configuring a co-reactant delivery system and delivering a co-reactant fluid comprising the co-reactant to the reactor;

controlling the spatial delivery of the reactant fluid comprising reactant into the reactor in at least one of the transverse directions;

configuring a diluent delivery system and delivering the diluent fluid to the reactor;

controlling a spatial delivery distribution of a diluent fluid comprising a diluent into the reactor, the distribution being taken in at least one of the transverse directions;

reacting reactant with co-reactant to form a reaction product, and mixing diluent with at least one of reactant, co-reactant and reaction product, and

delivering to an outlet of the reactor a product fluid comprising reaction product, diluent and a residual component comprising at least one of reactant and co-reactant; and

wherein controlling the at least one spatial distribution of each of the reactant fluid and the diluent fluid in at least one of the transverse directions controls the transverse distribution of at least one of the composition, temperature, pressure and streamwise velocity of the product fluid, near the reactor outlet in at least one of the transverse directions.

Claim 41 (Previously Presented)

The method of claim 40 wherein the diluent fluid comprises at least one of fluid water and carbon dioxide.

Claim 42 (Previously Presented)

The method of claim 40 further including controlling the mean outlet temperature of the product fluid exiting the reactor by controlling the amount of diluent delivered through the diluent delivery system to control the total enthalpy change relative to the heat of reaction and the fluid delivery temperatures.

Claim 43 (Currently Amended)

The method of claim 40 further including acoustically modulating the delivery of at least one of the delivered fluids thereby acoustically modulating the reacting fluid within the reactor.

Claim 44 (Previously Presented)

The method of claim 43 further including modulating the delivered fluid to at least 10 Hz.

Claim 45 (Previously Presented)

The method of claim 40 further including modulating the spatial delivery of the reactant fluid into the reactor to reduce fluid pressure oscillation within the reactor.

Claim 46 (Previously Presented)

The method of claim 40 further including modulating the spatial delivery of the diluent fluid into the reactor to reduce fluid pressure oscillation within the reactor.

Claim 47 (Currently Amended)

The method of claim 40 further including electrically exciting at least a portion of the ~~hot fluid~~ reaction product within the reactor.

Claim 48 (Currently Amended)

The method of claim 47 further including modulating the reaction product ~~hot fluid~~ to at least 2 kHz.

Claim 49 (Previously Presented)

The method of claim 40 further including configuring a diffuser and diffusing the co-reactant in the reactor and delivering a portion of the diluent as one of diluent vapor and steam, near the diffuser outlet.

Claim 50 (Previously Presented)

The method of claim 40 further including configuring a diffuser, diffusing the co-reactant in the reactor and delivering a portion of the diluent as liquid near the diffuser outlet.

Claim 51 (Previously Presented)

The method of claim 40 wherein at least a portion of the diluent delivered by the diluent

delivery system comprises one of diluent liquid and liquid water, and is delivered as a liquid into the reactor.

Claim 52 (Previously Presented)

The method of claim 40 further including delivering liquid and vapor diluent to the reactor and wherein at least a portion of the liquid diluent is delivered to the reactor streamwise downstream of the vapor diluent delivery.

Claim 53 (Previously Presented)

The method of claim 40 wherein the reactant delivery system and the diluent delivery system are configured to form interspersed reactable and non-reactable regions and further comprising providing a traversing region of reactable fluid traversing at least one of the non-reactable regions from one reactable region to another.

Claim 54 (Previously Presented)

The method of claim 40 wherein the co-reactant comprises oxygen containing fluid, the reactant comprises a combustible fuel, and the diluent comprises at least one of a vaporizable liquid, and liquid water.

Claim 55 (Currently Amended)

The method of claim 41 further including combusting the ~~fuel~~ reactant with the ~~oxidant~~ co-reactant within the reactor.

Claim 56 (Previously Presented)

The method of claim 40 wherein at least a portion of the diluent is delivered streamwise downstream of a rapid reaction front.

Claim 57 (Previously Presented)

The method of claim 40 further including controlling the evaporation of a vaporizable portion of diluent by controlling a streamwise flow direction velocity distribution of the diluent as delivered from the diluent delivery system evaluated along at least a first transverse direction.

Claim 58 (Previously Presented)

The method of claim 40 further including controlling the streamwise evaporation distance of the diluent in the reactor with respect to at least one of the transverse directions.

Claim 59 (Previously Presented)

The method of claim 40 further including configuring a high voltage power supply for at least one of the reactant delivery system or the diluent delivery system and generating a high voltage electric field within the reactor.

Claim 60 (Previously Presented)

The method of claim 59 further including modulating the high voltage electric fields.

Claim 61 (Previously Presented)

The method of claim 40 further including providing at least a portion of the reactor with coolant passages, cooling at least a portion of the reactor with diluent, and delivering at least a portion of the heated diluent to the reactor.

Claim 62 (Previously Presented)

The method of claim 40 further including controlling the temperature of the product fluid exiting the reactor by controlling the total diluent enthalpy change comprising vaporizable diluent being delivered to the reactor.

Claim 63 (Withdrawn)

A fluid delivery system comprising:

a pump comprising at least one pump member operable to move in at least one of a reciprocal and rotational movement to deliver a fluid with a flow delivery distribution per periodic pump cycle, and operable to move through at least one fluid delivery cycle;

a motor comprising at least one motor member operationally coupled to the at least one pump member and operable to produce said reciprocal or rotational movement; and

a controller operationally connected to the motor and configured to control the motor excitation whereby controlling the reciprocal or rotational movement of the at least one pump member;

wherein the controller is configured to vary the temporal distribution of at least one of a motor force or torque actuating the reciprocal or rotational pump movement within at least one pump cycle so as to control the temporal flow delivery distribution of the fluid delivered by the pump;

wherein the controller is configured to reduce the flow delivery fluctuations relative to those formed by a sinusoidal motor excitation.

Claim 64 (Withdrawn)

The fluid delivery system as in claim 63 further comprising at least one position reference sensor able to provide at least one position reference per motor cycle, and at least one motion sensor able to determine one or more of the acceleration, speed and position of the motor member, and the controller including a feed back routine that utilizes said sensors for varying the motor excitation of the reciprocal or rotational movement of the at least one pump member within the fluid delivery cycle.

Claim 65 (Withdrawn)

The fluid delivery system as in claim 64 wherein the motion sensor is operable to provide at least 1,000 measurements per pump cycle.

Claim 66 (Withdrawn)

The fluid delivery system as in claim 64 wherein the controller is configured to apply a prescribed electromagnetic excitation to the motor within 1 ms.

Claim 67 (Withdrawn)

The fluid delivery system as in claim 64 wherein a motor position sensor used is operable to provide at least 2,000 measurements per pump cycle with a resolution of at least 0.05%, and the controller is operable to change the motor torque with a closed loop bandwidth of at least 2 thousand times per second.

Claim 68 (Withdrawn)

The fluid delivery system as in claim 63 wherein a motor rotor has a torque to inertia ratio of at least 10,000 reciprocal seconds squared.

Claim 69 (Withdrawn)

The fluid delivery system as in claim 63 wherein a motor rotor and stator are cooled using a vaporizable coolant, and the motor rotor has a ratio of torque to inertia of at least 30,000 reciprocal seconds squared.

Claim 70 (Withdrawn)

The fluid delivery system as in claim 63 wherein the pump is operable to deliver at least one of a reactant liquid comprising a reactant, and a diluent liquid.

Claim 71 (Withdrawn)

The fluid delivery system as in claim 63 wherein the pump comprises a first pump member operable to deliver a reactant liquid comprising a reactant, and a second pump member operable to deliver a diluent liquid.

Claim 72 (Withdrawn)

The fluid delivery system as in claim 63 wherein the pump comprises a first pump member actuated by a first motor rotor comprising at least one first motor sensor, and a second pump member actuated by a second motor rotor comprising at least one second motor sensor, and wherein the controller is operable to control the motor rotors independently.

Claim 73 (Withdrawn)

The fluid delivery system as in claim 70 wherein the pump is coupled to a fluid distribution member comprising numerous orifices operable to deliver at least one of the liquids into the surrounding space.

Claim 74 (Withdrawn)

The fluid delivery system as in claim 73 wherein the fluid distribution member is

configured to provide a spatial array of orifices having a greatest transverse width, wherein the pump is positioned within the distance of the greatest transverse width from the center of the distribution array.

Claim 75 (Withdrawn)

A method of configuring a reactor for reacting at least a reactant fluid comprising a reactant, and a co-reactant fluid comprising a co-reactant, diluted by a diluent to form a reaction product, the reactor comprising:

a duct having a curvilinear streamwise fluid flow direction and a first and second transverse directions mutually distinct from the fluid flow direction, the first and second transverse directions defining a surface through a reactor location transverse to the flow;

a reactant distribution portion comprising at least one tubular portion having an outer surface and an inner surface, the inner surface defining a first reactant flow path for the reactant fluid, and a plurality of reactant fluid distribution orifices extending from the inner surface to the outer surface, the plurality of reactant distribution orifices having a spatial areal number density distribution and a size distribution with respect to at least one of the transverse directions;

a diluent distribution portion comprising at least one diluent tubular portion having an outer surface and an inner surface, the inner surface defining a first diluent flow path for the diluent fluid, and a plurality of diluent orifices extending from the inner surface to the outer surface of the diluent tubular portion, the plurality of diluent orifices having a spatial areal number density distribution and size distribution with respect to at least one of the transverse directions;

the method comprising:

determining the desired delivery mass flow rates for the reactant fluid comprising reactant, the co-reactant fluid comprising co-reactant, and a diluent fluid, the fluid inlet parameters and the desired output pressure and temperature of the product fluid exiting the reactor;

configuring the reactant distribution portion;

configuring the duct which defines a co-reactant flow path for the co-reactant fluid;

determining a transverse distribution of flow direction velocity of the co-reactant fluid with respect to at least one of the transverse directions;

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configuring at least one of the spatial density distribution and size distribution of the reactant orifices with respect to at least one of the transverse directions; and

configuring the diluent distribution portion comprising configuring at least one of the spatial density distribution and size distribution of the diluent orifices with respect to at least one of the transverse directions;

wherein achieving a desired transverse distribution, in at least one of the transverse directions, of at least one of the composition ratio of co-reactant concentration to reactant concentration, and the temperature of the product fluid comprising a reactant product, with respect to at least one of the transverse directions.

Claim 76 (Previously Presented)

A method of reacting a reactant with a co-reactant and mixing a diluent fluid with at least one of the reactant and co-reactant and a reaction product to form a product fluid; the method comprising:

configuring a reactor; the reactor having a streamwise fluid flow direction and a first and second transverse directions mutually distinct from the flow direction, the first and second transverse directions defining a surface through a reactor location transverse to the flow;

delivering a reactant fluid comprising the reactant with a spatial distribution to the reactor through a reactant delivery system;

delivering a co- reactant fluid comprising the co-reactant to the reactor with a spatial distribution; the delivery comprising diffusing the co-reactant into the reactor through a plurality of passages;

delivering the diluent fluid comprising the diluent with a spatial distribution to the reactor through a diluent delivery system;

wherein controlling the at least one spatial distribution of the co-reactant fluid and the diluent fluid in at least one of the transverse directions; and

wherein controlling at least one of the composition, temperature, pressure and velocity of the reaction product, in at least one transverse direction near an outlet of the reactor taken in the surface along a direction transverse to the flow.

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Claim 77 (Withdrawn)

A method of accurately controlling a reaction between reactant and co-reactant fluids, the method comprising:

delivering a reactant fluid comprising a reactant into numerous regions within a reactor with a non-uniform spatial reactant fluid delivery distribution across the regions;

delivering a co-reactant fluid comprising a co-reactant into the numerous regions with a spatially non-uniform co-reactant fluid delivery distribution across the regions;

mixing and reacting the reactant and the co-reactant fluids within and downstream of the numerous regions, whereby forming a reactor product fluid flow comprising reaction product, and at least one of reactant and co-reactant;

measuring a downstream residual concentration of the greater of reactant or co-reactant in the reactor product fluid downstream of the majority of the reaction between the reactant and co-reactant fluids;

controlling a delivery ratio of co-reactant fluid flow rate to the reactant fluid flow rate to within a prescribed range, based on the downstream residual concentration.

Claim 78 (Previously Presented)

The method of claim 40 further comprising controlling the delivery of diluent fluid and reactant fluid to the reactor to control the pressure within the reactor to within at least one specified safe operating bound of the co-reactant fluid delivery system.

Claim 79 (Previously Presented)

The method of claim 78 further comprising controlling the temperature of the product fluid.

Claim 80 (Previously Presented)

The method of claim 78 further comprising controlling the spatial distributions of the delivery of diluent fluid and of reactant fluid to the reactor wherein controlling the spatial distribution of pressure within the reactor in at least one of the transverse directions to within the at least one specified safe operating bound, and controlling the distribution of temperature of the product fluid in at least one of the transverse directions.

Claim 81 (Withdrawn)

A method of controlling a pressurized reactor; the method comprising:

providing a reactor; the reactor having a curvilinear streamwise flow direction and first and second transverse directions mutually distinct from the flow direction, the first and second transverse directions defining a surface through a reactor location transverse to the flow;

providing a reactant delivery system to deliver a reactant fluid comprising a reactant to the reactor;

providing a co-reactant delivery system comprising a compressor to deliver a co-reactant fluid comprising a co-reactant to the reactor;

providing a diluent delivery system to deliver a diluent fluid comprising a vaporizable diluent to the reactor;

wherein the pressures of the reactant, co-reactant and diluent fluids are above ambient;

reacting at least a portion of reactant with co-reactant whereby forming a reaction product;

mixing a portion of diluent fluid with at least one of the reactant and co-reactants and the reaction product whereby forming a product fluid comprising reaction product and diluent;

and controlling the delivery of at least one of diluent fluid and reactant fluid to the reactor wherein controlling the pressure within the reactor to within at least one specified compressor safe operating bound.

Claim 82 (Withdrawn)

The method of claim 81 further including controlling the temperature of the product fluid.

Claim 83 (Withdrawn)

The method of claim 81 further including controlling the delivery of at least one of the co-reactant fluid into the reactor with a spatial distribution prescribed in at least one of the transverse directions, and the diluent fluid into the reactor with a spatial distribution prescribed in at least one of the transverse directions wherein controlling at least one spatial distribution of at least one of the composition, temperature, pressure and velocity of the product fluid, in a surface along at least one direction transverse to the flow near an outlet of the reactor.

Claim 84 (Withdrawn)

The method of claim 81 further comprising controlling the spatial distributions of the delivery of both diluent fluid and of reactant fluid to the reactor wherein controlling the spatial distribution of pressure within the reactor in at least one of the transverse directions to within the at least one specified compressor safe operating bound, and controlling the spatial distribution of temperature of the product fluid the spatial distributions being evaluated in at least one of the directions transverse to the streamwise flow near the reactor outlet.